Evolution and Status of the Hydrogeomorphic (HGM) Approach to Assessing Wetland Functions

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Engineer Research and Development Center

Objectives

- Evolution of the HGM Approach
- Current Status

HGM Approach Overview

What is the HGM Approach?

- Method for assessing the functional capacity of a wetland
- Designed initially for assessing change in function in the 404 public interest review process in order to:
  - Compare alternatives
  - Identify how to minimize impacts
  - Assess project impacts
  - Determine mitigation requirements
  - Monitor success / failure of mitigation

HGM Approach
Overview

An interagency, interdisciplinary procedure implemented in two phases to assess wetland functions using hydrogeomorphic classification, reference wetlands, and assessment models calibrated with field data

HGM Approach
Overview

How does the HGM approach differ from other methods?

- Classification by functional properties:
  - Geomorphic setting; water source; hydrodynamics
- Critical identification of functions and models
  - All wetlands do not have the same functions
  - Levels of similar functions may vary among classes
- Use of reference as standard of comparison
  - Comparative community and ecosystem ecology

HGM Approach Overview

Hydrogeomorphic Classification

- **Hydrology and geomorphology strongly influence how wetlands function**
- **As a result, the hydrogeomorphic classification is based on:**
  - **Geomorphic setting**
  - **Water source**
  - **Hydrodynamics**

HGM Approach Overview

What is an assessment model?

- **Simple representation of how specific characteristics and processes of the wetland and surrounding landscape influence the capacity of a wetland to perform a function**
- **Consists of model variables aggregated in a simple equation to produce a functional capacity index (FCI)**

$$FCI=[(V_{FREQ} \; X \; V_{XSEC})^{1/2} \; X \; (V_{ROUGH} + V_{GRADIENT})/2]^{1/2}$$

HGM Approach Overview

What are reference wetlands?

- **A group of wetlands that encompass the range of variability exhibited by a regional wetland subclass**
- **Variability is a result of:**
  - **Natural processes and disturbance**
  - **Anthropogenic alterations**
- **Provide data for calibrating model variables and functional capacity indices**

HGM Approach Overview

Implementation of the HGM Approach:

- **Development Phase**
  - **Interdisciplinary team of regional experts develops regional guidebook**
- **Application Phase**
  - **Field personal from federal, state, local agencies and private sector assess wetlands using the regional guidebook**

HGM Approach Overview

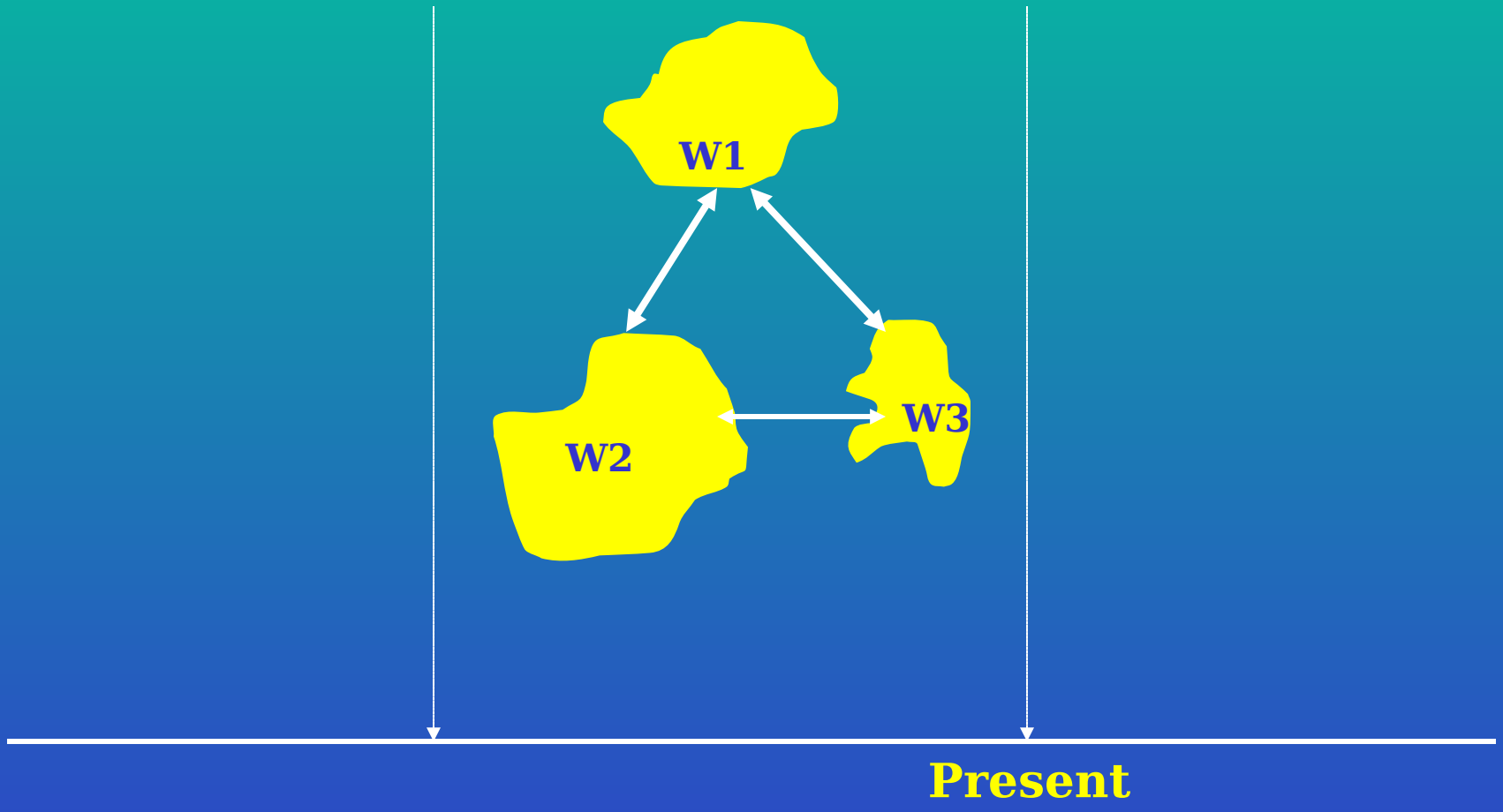
Why a two-phased approach?

- **Makes it possible to leverage…**
  - **Knowledge and experience of regional experts**
  - **Data from reference wetlands**
- **Against**
  - **The inherent time, manpower, and technical constraints of the planning and permit review process**

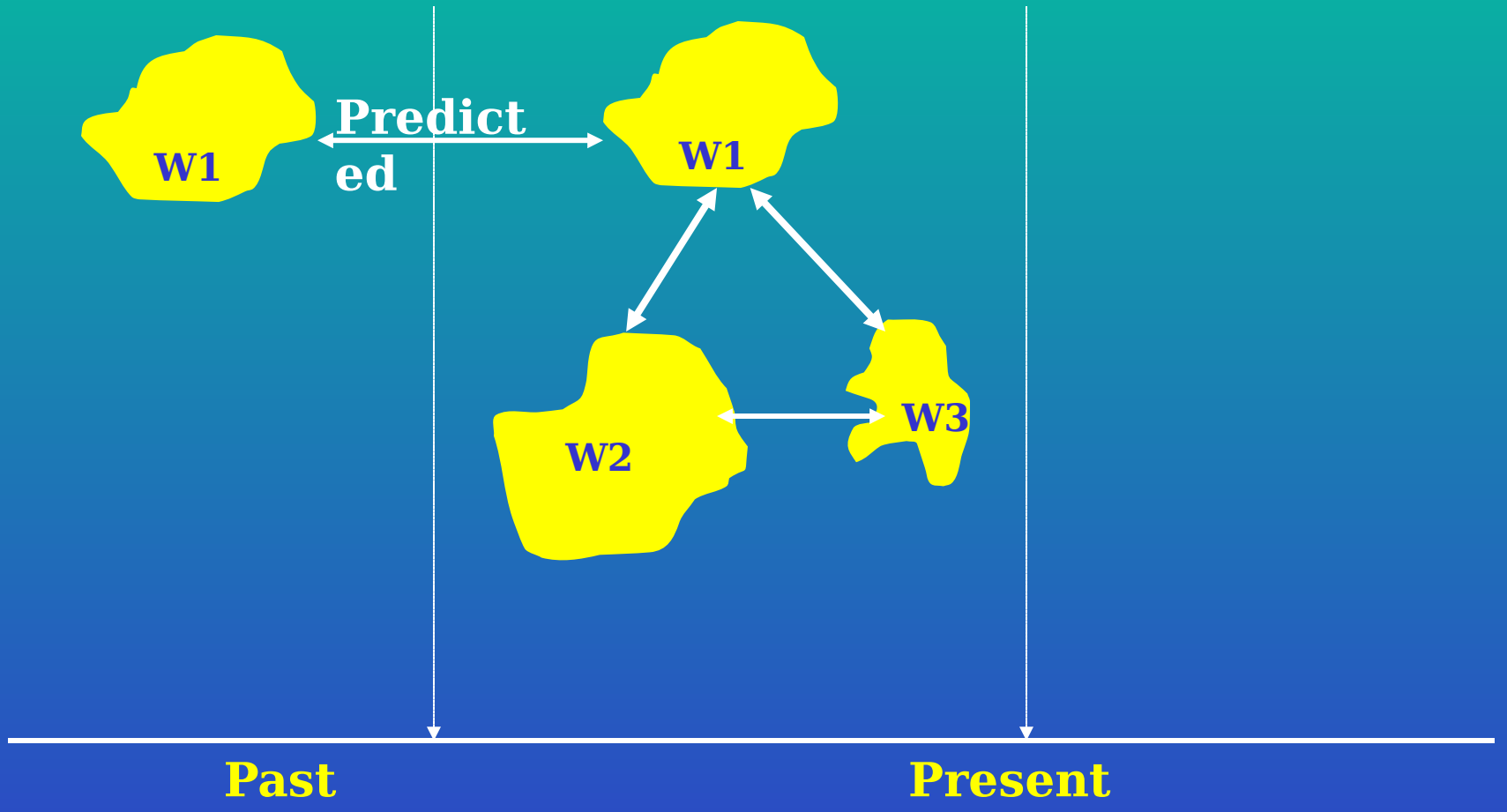
Sample Calculation of FCU

	FCI	Acres	FCU
Function 1	1	10	10
Function 2	0.5	10	5
Function 3	0.1	10	1
Function 4	1	10	10
Function 5	0.5	10	5

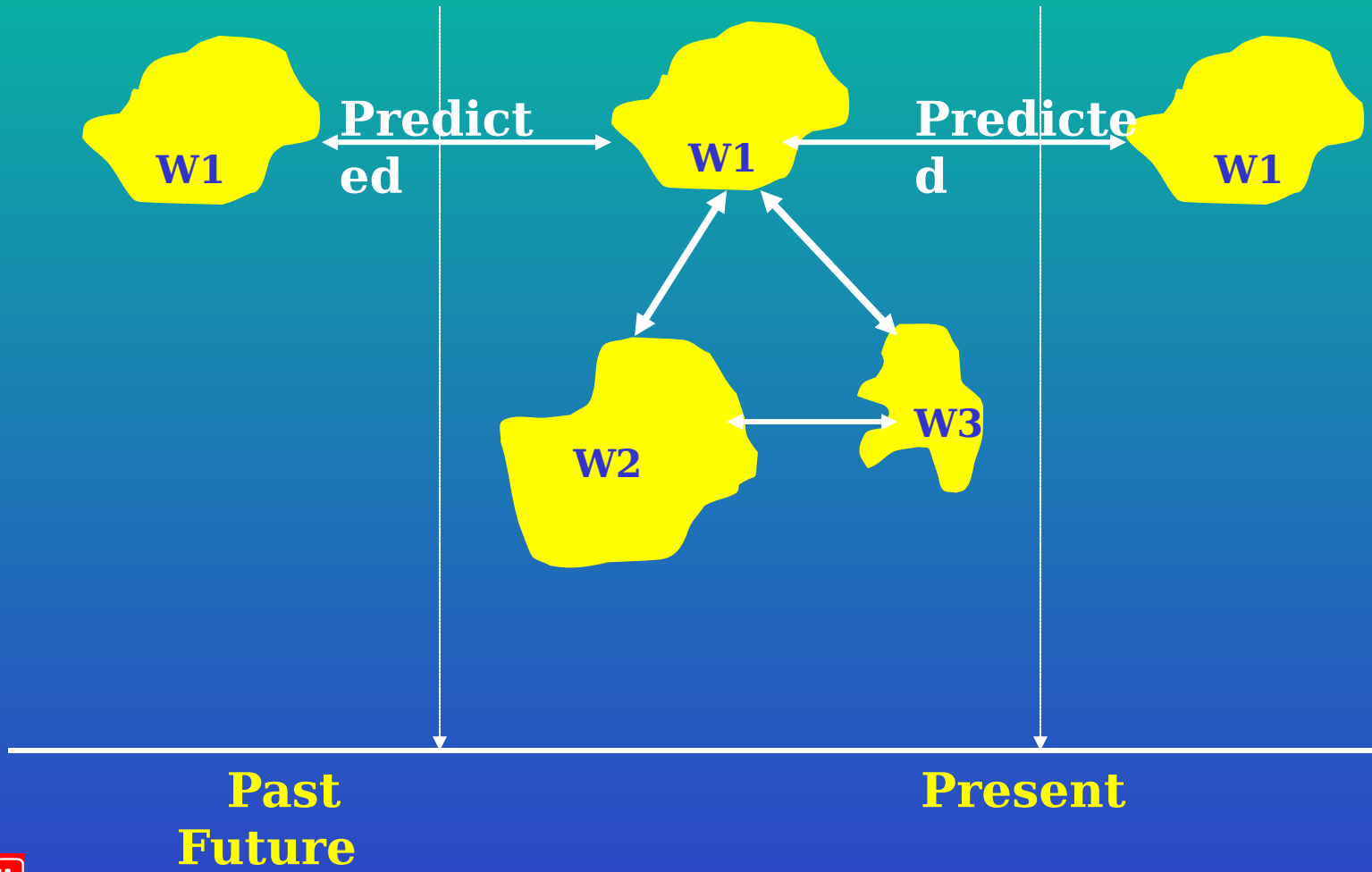
Potential Assessment Applications



Potential Assessment Applications

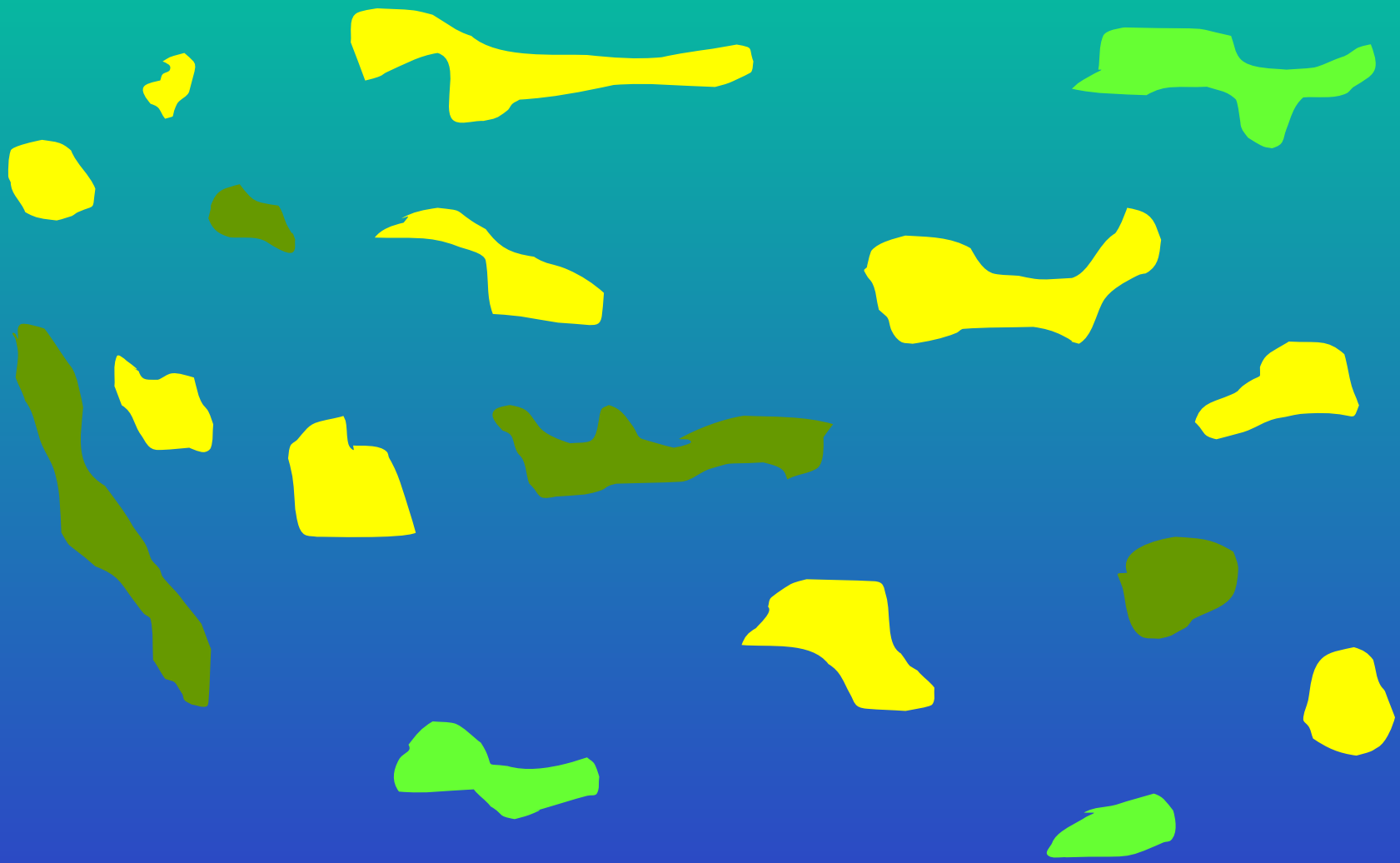


Potential Assessment Applications



HGM Approach
Landscape Analysis

- Identify wetlands
- Classify
- Characterize
- Add functional models to GIS
- Compute FCI's for each function



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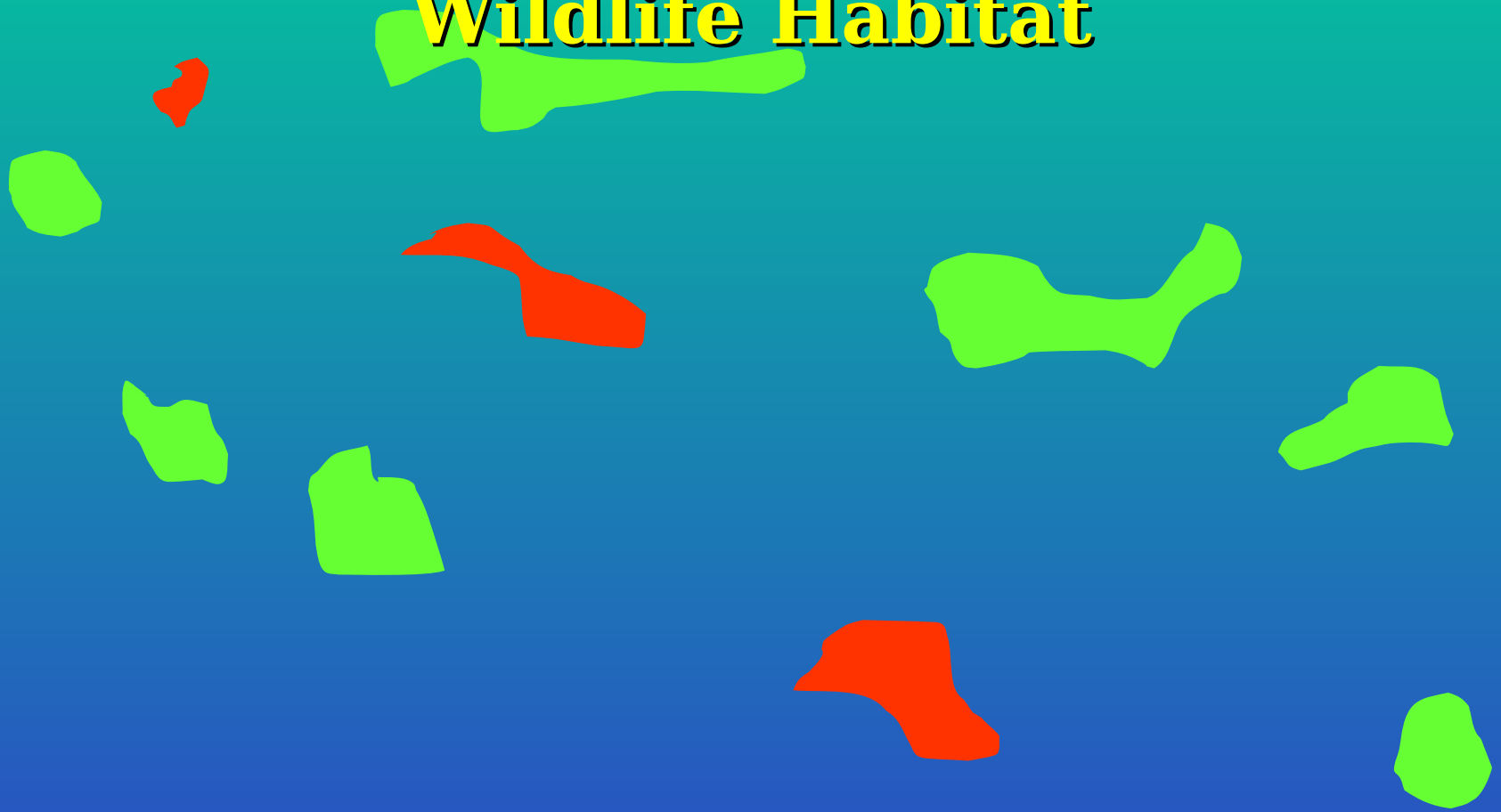
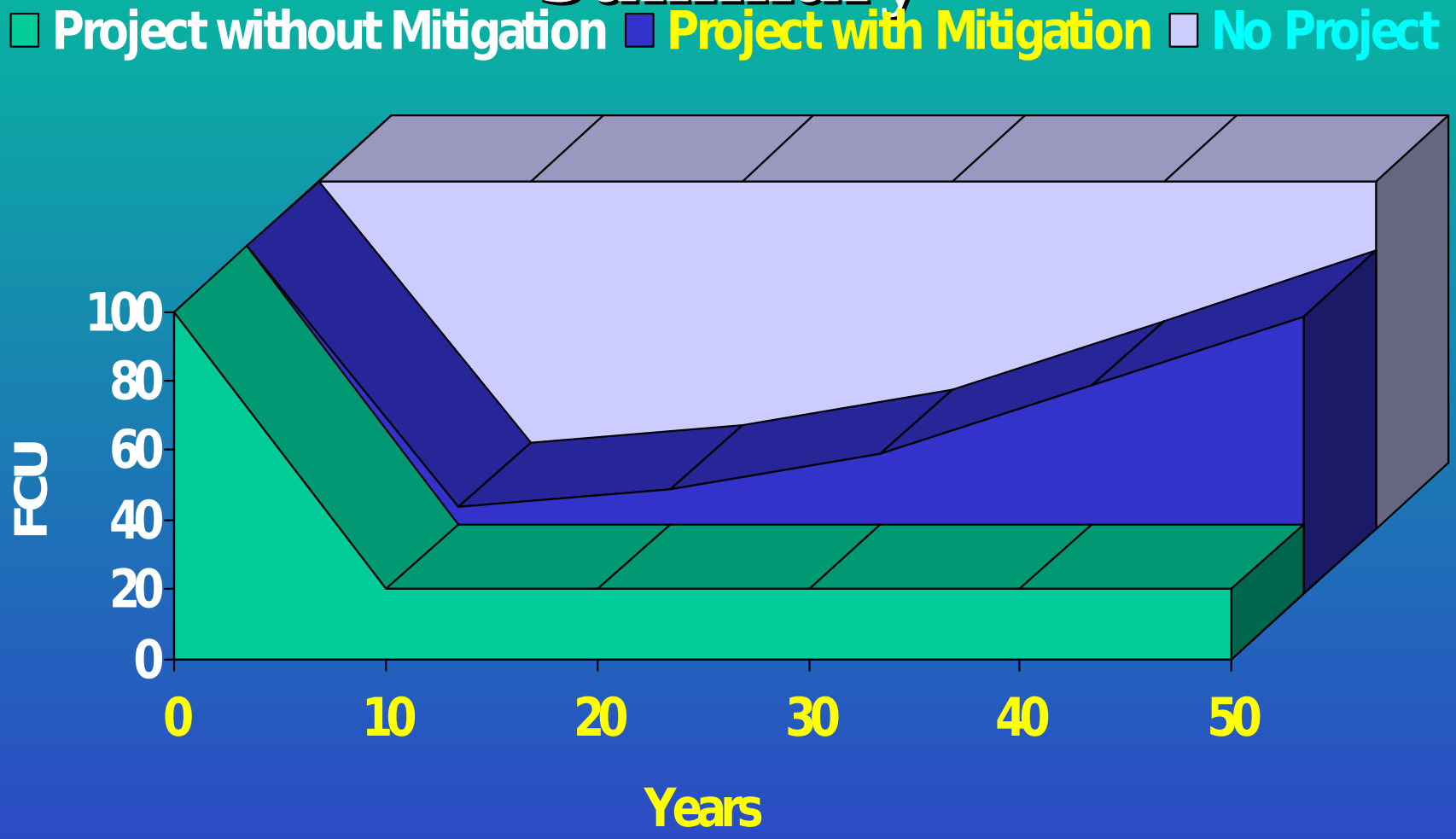
Surface Water Storage

Wildlife Habitat

Surface Water Storage and Wildlife Habitat



Project / Mitigation FCU Summary



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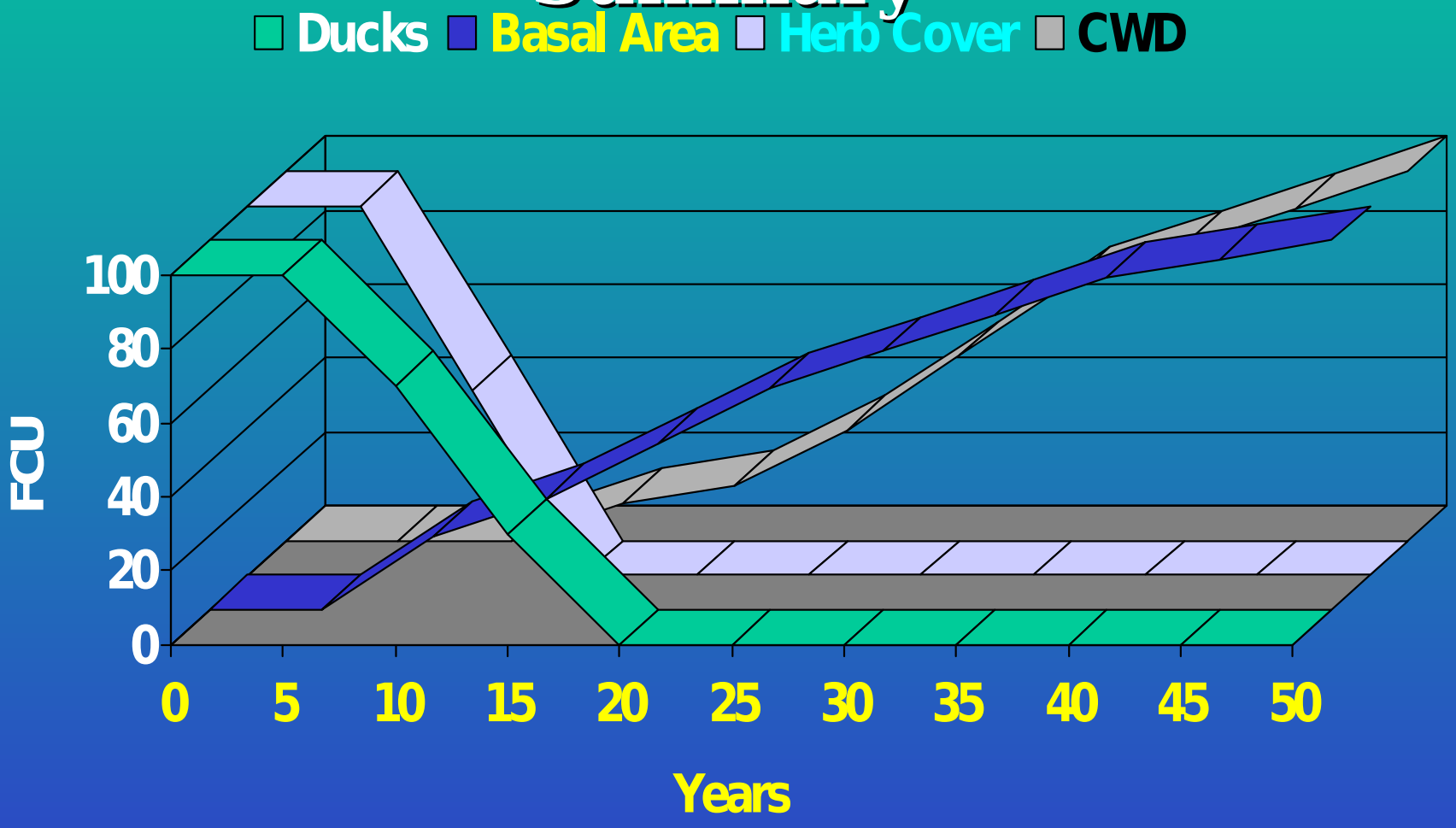

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Overview

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Overview

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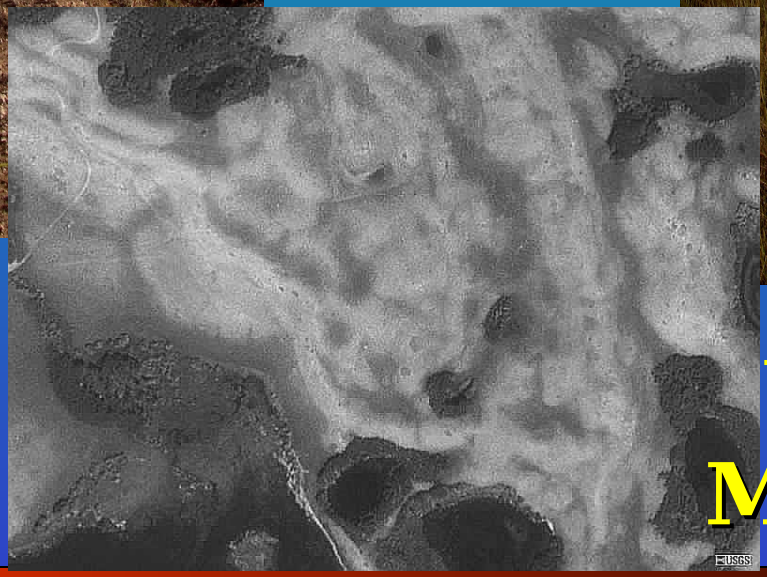
The HGM Approach

Impact Analysis

Mitigation



Watershed Management

US Army Corps of Engineers

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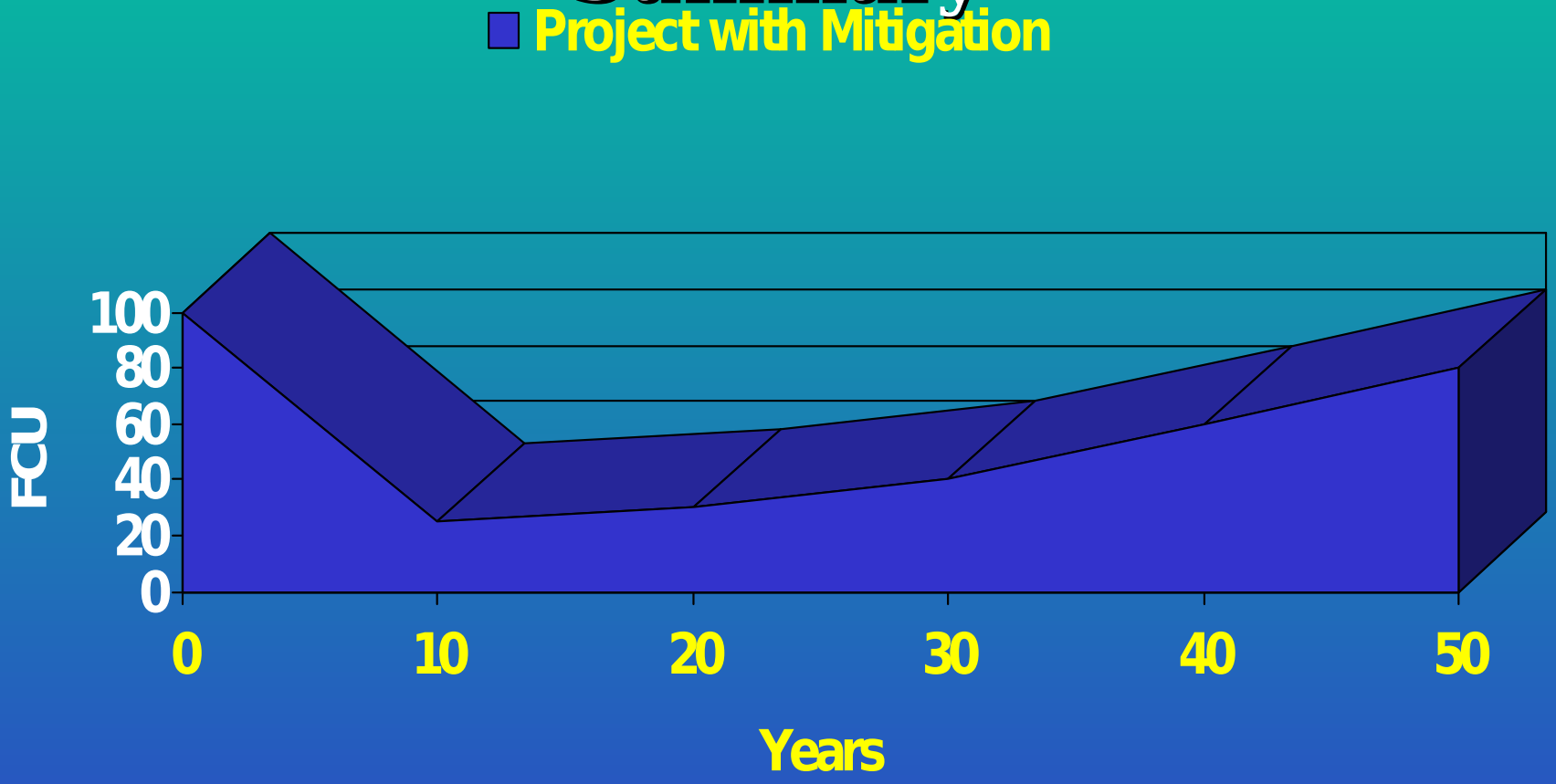
Project / Mitigation FCU Summary



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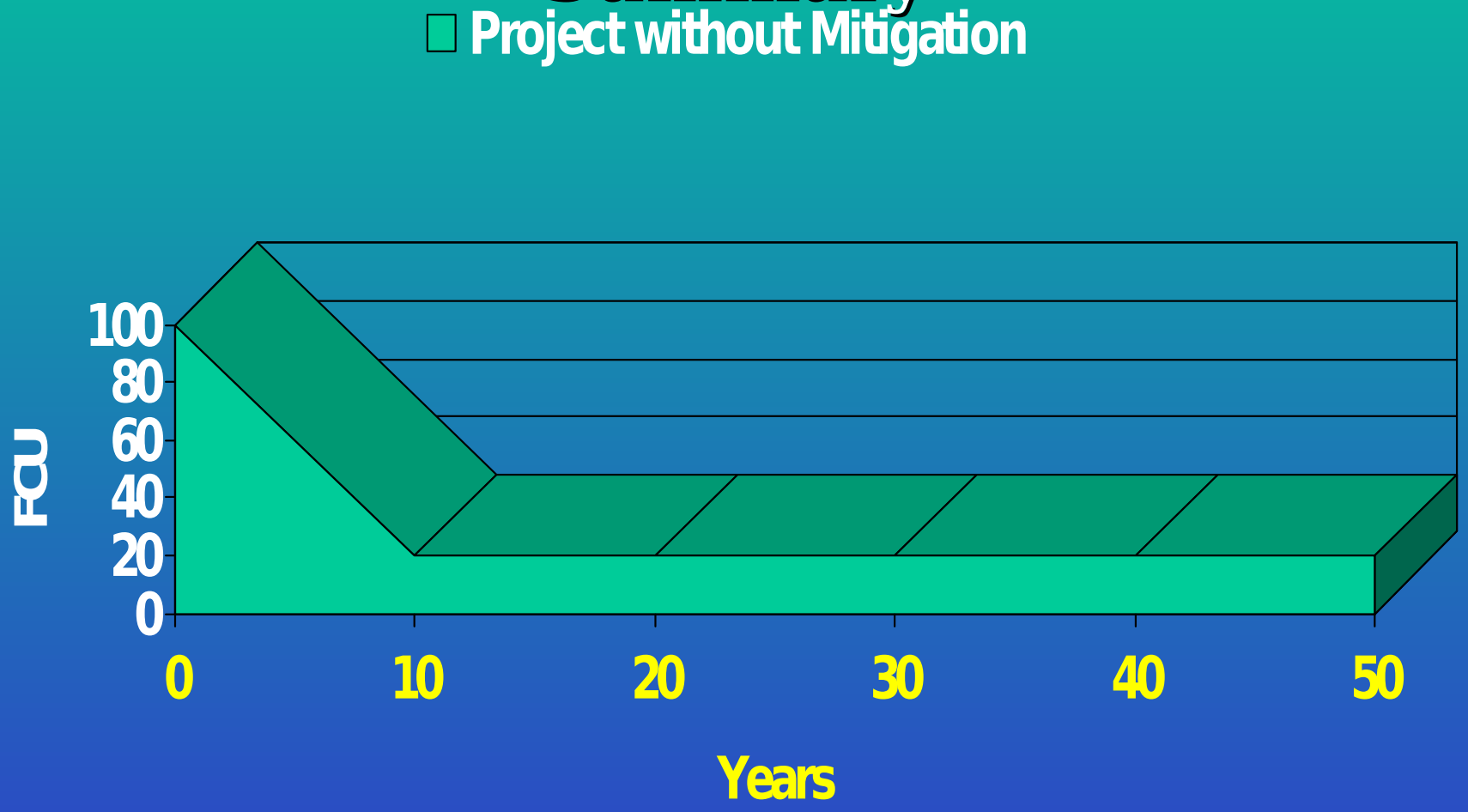

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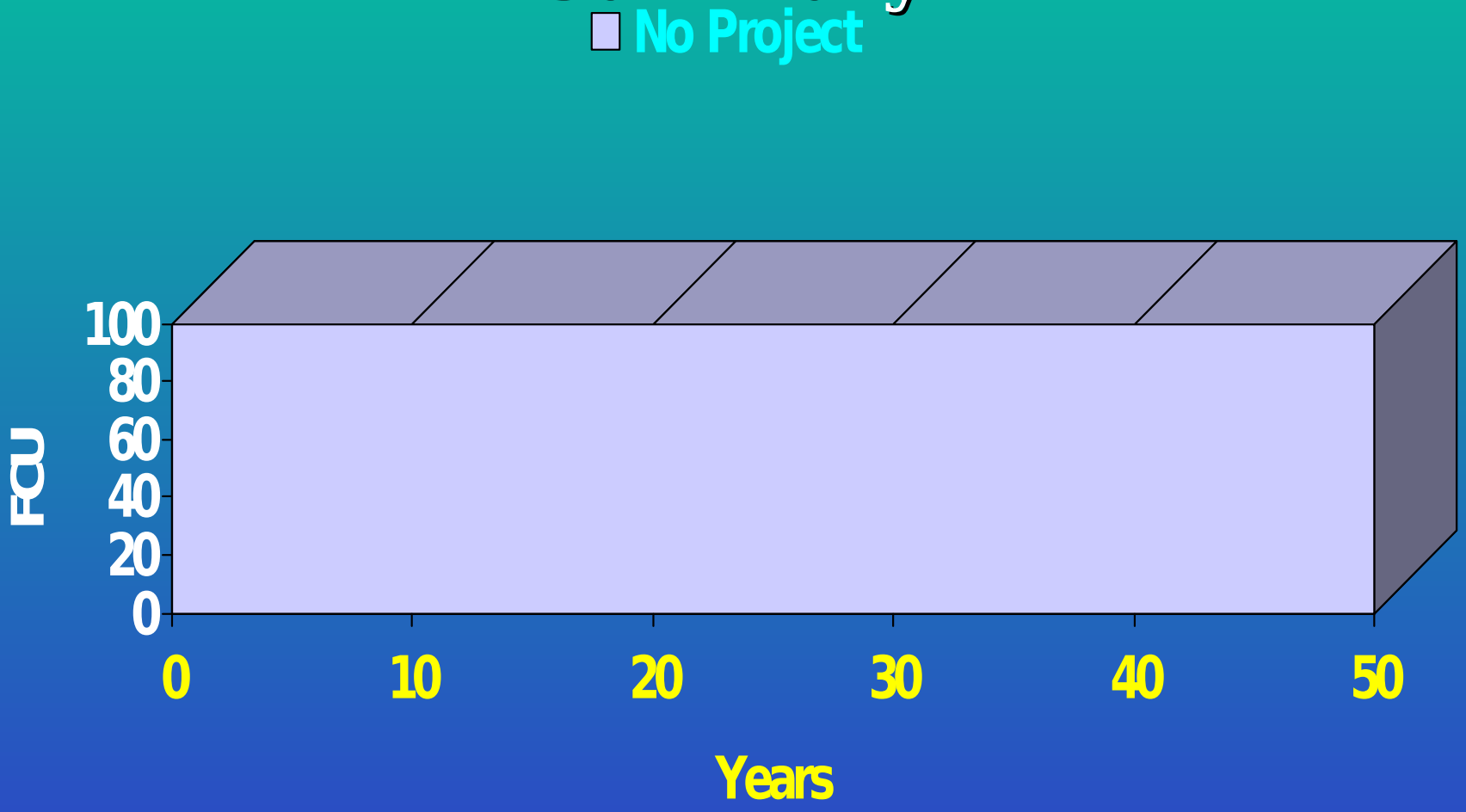


HGM Approach
Landscape Analysis

- Identify wetlands
- Classify
- Characterize
- Add functional models to GIS
- Compute FCI's for each function
- What ifs???

Evolution

- 1980 - Water Resources Council
- 1987 - WET

Evolution

CE/EPA Mitigation MOA

THE DETERMINATION OF WHAT LEVEL OF MITIGATION CONSTITUTES "APPROPRIATE" MITIGATION IS BASED ON THE VALUES AND FUNCTIONS OF THE AQUATIC RESOURCES THAT WILL BE IMPACTED.

IN DETERMINING COMPENSATORY MITIGATION, THE FUNCTIONAL VALUES LOST BY THE RESOURCE TO BE IMPACTED MUST BE CONSIDERED.

MOA 7 Feb 1990

Evolution

CE/EPA Mitigation MOA

..., SUCH MITIGATION SHOULD PROVIDE, AT A MINIMUM, ONE FOR ONE FUNCTIONAL REPLACEMENT (i.e., no net loss of values), ...

... THIS RATIO MAY BE GREATER ...

MOA 7 Feb 1990

Evolution

CE/EPA Mitigation MOA

THE CORPS ... WILL STRIVE TO ACHIEVE A GOAL OF NO OVERALL NET LOSS OF VALUES AND FUNCTIONS .

MOA 7 Feb 1990

Evolution

- 1980 - Water Resources Council
- 1987 - WET
- **1990 - Wetlands Research Program**
- **1993 - Concepts of the HGM Approach**
- **1993 - White House Office on Environmental Policy**

Evolution

" … agencies will expedite current efforts being coordinated by the Corps Waterways Experiment Station to develop an improved wetland assessment tool, the Hydrogeomorphic Classification System, …"

White House Office on Environmental Policy

April 24, 1993

Evolution

- 1980 -Water Resources Council
- 1987 - WET
- 1990 - Wetlands Research Program
- 1993 - Concepts of HGM
- 1993 - White House Office on Environmental Policy

- **1994 – National Interagency Implementation Team**
- **1994 – Regional Guidebook Development**
- **1995 – National Action Plan**

Evolution

National Action Plan

What is it?

- Document developed by a National Interagency Implementation Team
- Identifies the strategy the agencies will follow in implementing the HGM Approach
- Provides a mechanism for participation by others

Evolution

Federal Agency Participation

- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- USDA Natural Resources Conservation Service
- Federal Highway Administration
- NOAA National Marine Fisheries Service

Status of the HGM Approach
Types of Publications

- National Documents
- National Guidebooks
- Regional Guidebooks

Status of the HGM Approach
National Documents

- **Procedural Document – Pub Nov. 1995**
- **Classification Document – Pub March 1996**
- **National Action Plan – June 1997 in *Fed. Reg.***
- **Guidelines for Developing Regional Guidebooks – Four chapters published**
- **Guidelines for Developing Regional Guidebooks – Four chapters in draft**

National Guidebooks

US Army Corps of Engineers
Waterways Experiment Station

WETLANDS RESEARCH PROGRAM

TECHNICAL REPORT WRP-DE-16

National Guidebook for Application of Hydrogeomorphic Assessment to Tidal Fringe Wetlands

by
Deborah J. Shafer and David J. Yozzo
Technical Editors

Wetlands Ecology Branch
U.S. Army Engineer Waterways Experiment Station
3909 Halls Ferry Road, Vicksburg, MS 39180-6199

December 1998 — Final Report

Approved For Public Release; Distribution Is Unlimited

US Army Corps of Engineers
Waterways Experiment Station

Wetlands Research Program Technical Report WRP-DE-11

A Guidebook for Application of Hydrogeomorphic Assessments to Riverine Wetlands

by Mark M. Brinson, F. Richard Hauer, Lyndon C. Lee, Wade L. Nutter, Richard D. Rheinhardt, R. Daniel Smith, Dennis Whigham

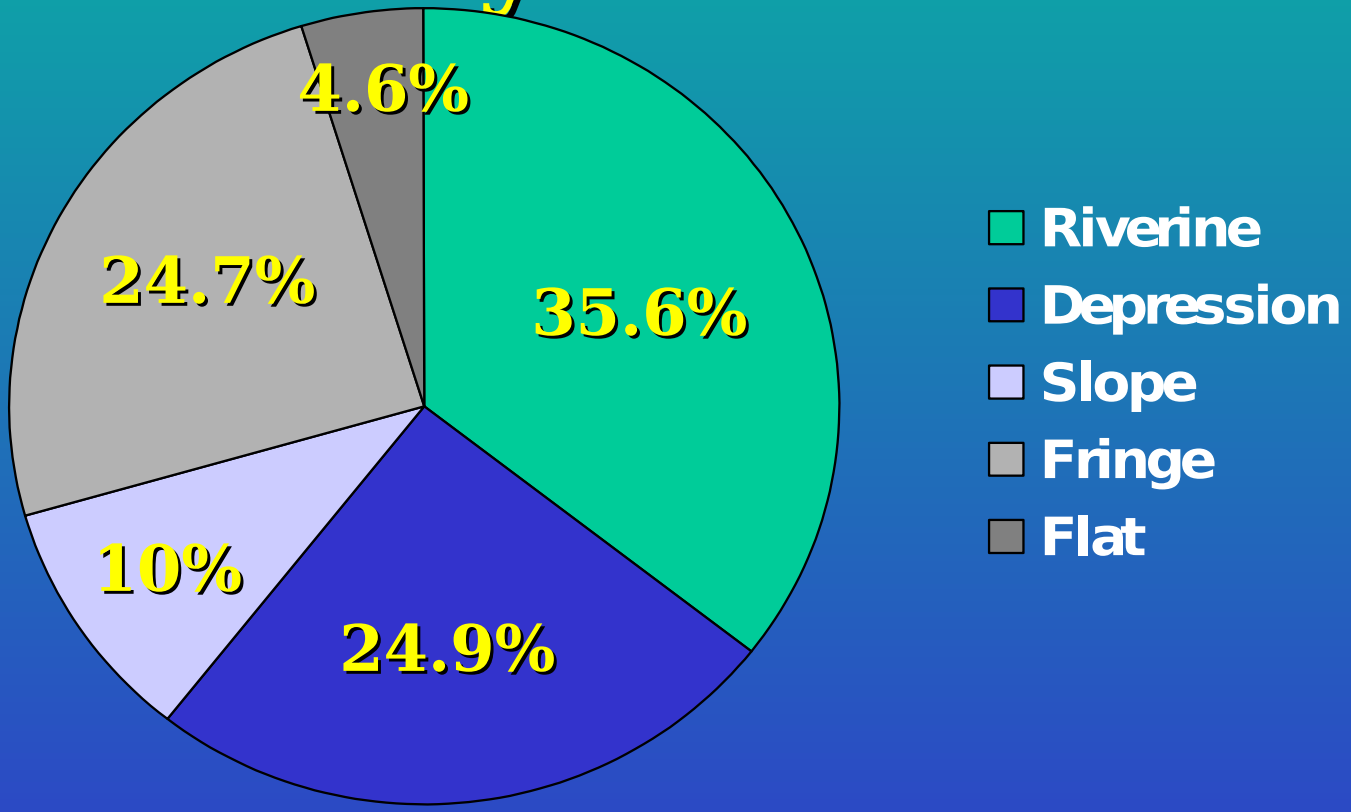
November 1995 – Operational Draft
Approved For Public Release; Distribution Is Unlimited

Status of the HGM Approach

National Guidebooks

- **Riverine – Pub March 1996**
- **Fringe: Estuarine – Pub December 1998**
- **Depressions – Draft in review**

Distribution of Permit Load By Wetland Class



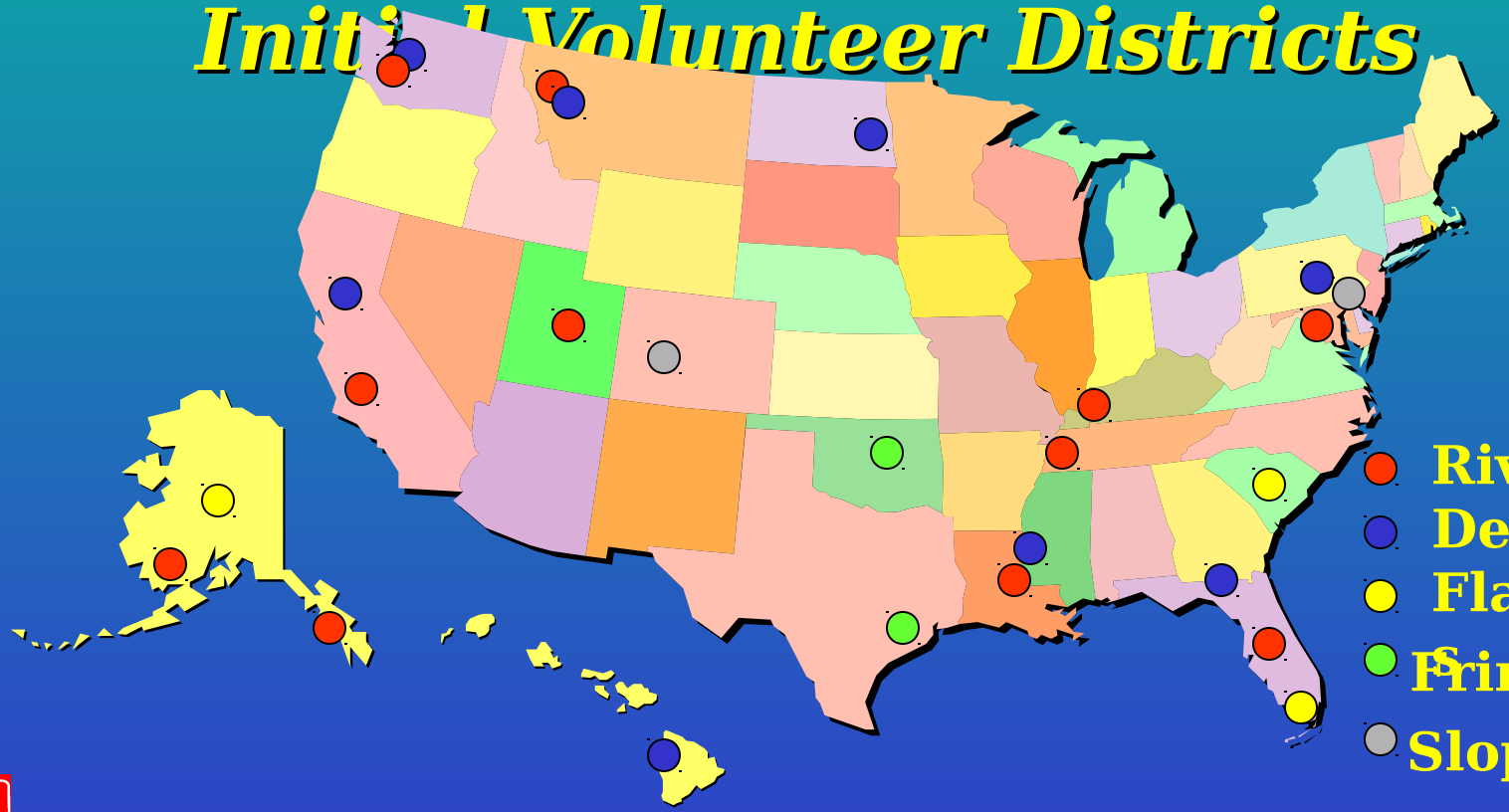
Regional Guidebook Development

Initial Volunteer Districts

- Riverine
- Depressions
- Flat
  s

Regional Guidebook Development

Initial Volunteer Districts



Status of the HGM Approach

Published Regional Guidebooks

- Riverine
  - Western KY
  - Western TN
  - Northern Rockies
  - Central FL Blackwater
- Depressions
  - Northern Rockies

Status of the HGM Approach

Published Regional Guidebooks

- Flats
  - Pine Flatwoods
- Fringe
  - Northern Gulf of Mexico
- Others
  - Yazoo

Status of the HGM Approach

Ongoing Regional Guidebooks

- Riverine - 4
- Depression - 6
- Slopes - 1
- Fringe - 1
- Flats - 2
- Others - 2 (12 subclasses)

Status of the HGM Approach

Ongoing Regional Guidebooks

- Riverine
  - Coastal CA
  - Central CA
  - Coastal SC
  - Western Riparian

Status of the HGM Approach

Ongoing Regional Guidebooks

- Depressions
  - Prairie Potholes
  - Rainwater Basin
  - Central Florida
  - Vernal Pools
  - Saipan
  - Spring Fed Seeps in CO

Status of the HGM Approach

Ongoing Regional Guidebooks

- Slopes
  - Kenai Peninsula
- Fringe
  - Tulsa Lacustrine
- Flats
  - Disc. Permafrost, AK

Status of the HGM Approach

Ongoing Regional Guidebooks

- Others - 2 (15 subclasses)
  - Pennsylvania (7 subclasses)
  - Arkansas (5 subclasses)

Status of the HGM Approach

Technology Transfer

- Publications
- WWW
  - http://www.wes.army.mil/el/wetlands/hgmhp.html
- Training
  - Three types of courses

Summary

- The HGM Approach provides the best, scientifically based assessment method available
- Substantial interagency cooperation has been achieved
- Priority wetland subclasses are being developed based on needs and priorities of the CE and other Federal and state agencies